PHILOSOPHICAL ADVENTURES OF THE IDEA OF EVOLUTION: 1859-1959

I

AN ESSAY on the philosophy of evolution in the century since the publication of Darwin's *Origin of Species*[1] can be written in two sentences. By the end of the first fifty years, everybody in the educated world took evolution for granted, but the idea was still intellectually exciting and its philosophical exploitation was entering upon its period of full maturity. By the end of the next fifty years, evolution belongs to "common sense" almost as thoroughly as the Copernican hypothesis and other early landmarks of the scientific revolution; but the idea is no longer exciting, and evolutionary philosophy is out of fashion.

The following pages will trace the adventures of the idea of evolution primarily in its second fifty years. The first fifty years were the heroic age of the idea, when it was fervently propagated by confident believers, ready and willing to do battle against all comers. Many were the dragons of philosophical and theological error slain in heated polemic. By 1909, when John Dewey published the perceptive article, "Darwin's Influence on Philosophy,"[2] he could write of victories won and triumphs assured. His was a story of old error exposed and of new truth to be celebrated.

Dewey could afford to write with confidence. The excitement of Darwin's ideas had fertilized thought and investigation for half a century, in social studies, ethics, and metaphysics no less than in biology. Research could doubtless discover how men who were to lead thought in various fields had come under the spell of particular Darwinian ideas at identifiable stages of their intellectual growth; yet that kind of study may not convey a sense of the full impact of the

idea of evolution on thought. Though Darwin's studies, of course, did not originate the idea, they surrounded it with the aura of scientific prestige in a supreme degree. Evolutioned captured the imagination of the literate public and shaped the outlook of countless men who never read a word that Darwin wrote and never achieved a clear notion of what he tried to prove. Evolutionism descended like a flooding rain on the Western mind; it washed everything, penetrated into every crevice, engulfed some opinions and brought life to some that might otherwise have lain much longer dormant. It drenched and drowned and fructified—with the massive impartiality of every great idea. Men suddently—from our perspective, in 1959, suddenly—found they could no longer think in old ways. Familiar beliefs that had always been accepted without question became simply implausible. Just such a drastic revision of fundamental outlook characterized all the major intellectual revolutions—notably the early Greek, the Christian, the modern (scientific) revolution in ideas. Darwin created for his successors a new world image or "root metaphor," or "absolute presupposition." After 1859—the date is arbitrary to a degree—the older world images ceased to mirror the world to men's minds, ceased to allude to what seemed relevant to proper understanding. The world wore a different look.

If the foregoing account should give anyone the impression of an abrupt or instantaneous change, that would be unfortunate. It goes without saying that the Darwinian revolution did not take place in an instant. Like any other great movement of ideas, it worked its way in the minds of individual men, spreading by a kind of intellectual contagion —or conversion—one mind at a time; but its ultimate triumph was assured. After 1859 there was no turning back. By the end of fifty years, the revolution had been carried through.

It had become "natural" for educated men to view themselves and the world in an evolutionary perspective.

Beliefs may become familiar and customary without being adequately understood; indeed, this is the rule rather than the exception. Adequate analysis and interpretation of ideas, the business of philosophy, comes late because it is difficult. Take any key idea (e.g., substance, form, matter, cause, time, space), and its career will confirm this judgment. The case of evolution is no exception. Men became accustomed to it without clearly grasping either its nature or its implications. Precisely in this obscurity lay the task for philosophy, for a philosopher is a man with one principal eccentricity: he cannot rest until he knows what he believes—in the dual sense of knowing *what* he believes and of *knowing* what he believes. The evolutionary philosopher had to determine what features imparted to the notion of evolution its transforming power (thus defining *what* he believed); and he had to place these features in relation to all other fundamental aspects of the cosmos so as to be assured of the coherence of his various insights (thus coming to *know* what he believed).

On a previous page, Darwinism was compared to the major intellectual revolutions in the history of the Western mind. The comparison referred primarily to the impersonal, massive, almost inexorable sweep of the evolutionary idea; but in scope and basic novelty it hardly belongs in such company. The Darwinian revolution, important as it has been, is no more than an incident in the modern scientific movement. Minds that had already undergone the scientific revolution could take Darwinism in stride without important modification of fundamental assumptions. Of the major innovations this is not true; they alter the whole cast of an epoch's thought.

What Darwin did was to extend the basic scientific atti-

tudes over the whole range of biological phenomena. Scientifically he was conservative, no friend of innovation. He nevertheless had the impact of a revolutionary innovator in ideas and achieved prompt notoriety in a world presumably accustomed, since the Enlightenment of the eighteenth century, to accept the main tenets of the scientific revolution of the seventeenth. We may justly speak of the Darwinian revolution, because Darwin brought home to the nineteenth century some implications of the scientific revolution which startled conventional (i.e., unthinking) minds. There resulted public agitation and heated dispute that impeded impartial philosophical clarification.

The true significance of evolutionism for philosophy, and the real problems which it posed for adequate interpretation, were lost from view in the excitement of doing battle against manifest incompetence. Ignorance once more was fighting and losing a last-ditch battle with critical scientific intelligence;[3] but the folly of the losers' tactics may have prompted the winning side to form an exaggerated estimate of its own merits. The obscurity of its own systematic ideas was not recognized. More importantly, it passed unnoticed that the very notion of evolution contained suggestions of a way of viewing events quite at variance with the mechanistic root-metaphor of the scientific revolution.

The nineteenth century brought the idea of evolution into the center of intellectual ferment. Before Darwin, Herbert Spencer had attempted a systematic evolutionary philosophy. He exploited the notion of evolution that, from the time of Erasmus Darwin and Lamarck in the eighteenth century, had enjoyed a more or less lively existence on the speculative fringes of European thought. Charles Darwin himself delayed little in drawing far-reaching philosophical conclusions

about human morals and progress. Neither Darwin nor Spencer perceived all the philosophical implications of their central idea. They performed well the service of spreading the notion of evolution, but its adequate critical treatment had to await the twentieth century.

By a delightful coincidence, three of the most original interpreters of the idea of evolution in philosophy were born in the very year of publication of *The Origin of Species*, 1859: John Dewey, the most American of philosophers, prophet of experimental intelligence as the avenue to human welfare; Henri Bergson, the brilliant French interpreter of the creativity of evolution; and Samuel Alexander, the Australian-English realist philosopher of boldly speculative power, who attempted a unique synthesis of evolutionary and relativistic cosmology. A fourth and slightly later philosopher of the first rank who may be considered to have made fundamental contributions to the philosophy of evolution was Alfred North Whitehead. But in his philosophy the idea of evolution had already retreated into the background, being absorbed into and partially disguised, if not superseded, by the idea of organism. It is taken up into and transmuted by a philosophical construction that with profound originality brings the philosophy of emergent novelty back into relation with the great Platonic tradition.

By the late twenties, when Whitehead was at the peak of his metaphysical career, the course of philosophy was already turning into new channels. There were two of these, and they were vastly different from each other as well as from the type of philosophy to which the idea of evolution contributes. One channel is that of minute logical, linguistic, or positivistic analysis—a stubbornly epistemological emphasis that shrinks from the extravagance of speculative hypotheses in

cosmology. The other channel is that known widely, though vaguely, as existentialism. Every leading existentialist, with considerable justification, refuses to accept the label; existentialism, nevertheless, stands for a temper and style of philosophy strikingly different from that of science-oriented works that constitute much of the philosophical bibliography of the past century. The one channel is basically sceptical, being obsessed by the desire for clear statement and sufficient verification. The other may be sceptical, too—of our *human* values; but it often exploits this emptiness as preliminary to an act of faith. Neither of these philosophical styles lends itself to significant exploitation of evolutionary ideas. One is preoccupied with details of logical syntax or of common verbal usage; the other is absorbed in the predicament each man on earth is in—*is* in. This is the present and only predicament of each, and neither an evolutionary past nor an evolutionary future has anything to offer concerning it.

II

Darwin showed his scientific conservatism by devising a theory of evolution which makes no use of final causes, or purposes. One of the most radical innovations of the modern epoch of thought had been the rejection of final causes in nature. At a stroke, this denial reduced all explanations to mechanistic terms. That fact was already perfectly clear to Descartes, who, boldly consistent, hinted at a cosmic evolution of the physical order we know; he construed living bodies as immensely complex machines and explained their behavior in terms of reflex actions triggered by motions impinging on them from without. It is still the same with philosophers of physical science—however they may debate the exact nature of causality, or the meaning in physics of determinism and

indeterminism, or of randomness, none pays a moment's attention to purposiveness. Nor did Darwin do so in constructing his concept of evolution.

It was, in fact, precisely the explanation of evolutionary processes without appeal to final causes that formed the essence of his originality and gave his *Origin of Species* the character of a revolutionary document. In a sense, Darwin said only what scientists had been saying all along. Had he not obtained one of his chief clues from Lyell's studies of the cumulative record of geological changes through ordinary causes? His conservatism had revolutionary impact because he described a *mechanism* of evolution that seemed to account for the empirical facts throughout the entire range of biological phenomena. You have only to assume random minute variations, and natural surroundings making the survival of some of these more probable than survival of others, and you have the mechanism of the origin of species. The seeming purposiveness of the adaptation of living forms to their conditions of life vanishes in a way of looking at them that makes no allusion to ends. In the face of the vast quantity of detailed evidence assembled by Darwin and marshaled in his works, the doctrine of special creation had to be abandoned—that extraordinary blend of bad theology and bad Aristotle. Men suddenly discovered stranger ancestors than Adam. Pious but uninstructed common sense received a shock comparable to that administered by the Copernican hypothesis. Teleology, already excluded from transactions of mere matter in motion, now had to yield the stronghold of living things, seemingly so full of purposes.

To Darwin's credit it may be said that he was not a doctrinaire Darwinian. He seems to have kept a more open mind than some of his followers toward the inheritance of ac-

quired characteristics, and he ended by inconsistently attributing to evolution a tendency toward greater goodness. The consistent core and source of the revolutionary power of Darwin was, nevertheless, the mechanizing and naturalizing of life over its whole range. His simple theory had stupendous systematizing power.

Darwin's scientific conservatism has received most of our attention so far. His naturalism—his methodological assumption that everything in nature has an empirical explanation—offered man a new image of himself, or, more accurately, confirmed and sharpened the modern scientific image of him. This formed, quite understandably, the center about which the storms of controversy whirled. When the storms at length had subsided, leaving only long rollers to disturb the distant shores of backward opinion, some philosophers who had grown up amidst the intellectual excitement of the first generation of Darwinism began to perceive that the idea of evolution had more profoundly revolutionary implications for philosophy than had hitherto been appreciated. They saw the situation in different ways; but they all saw that the idea of evolution departs radically from the characteristic assumptions of modern scientific naturalism. It was evident that the fundamentals of the position had to be re-examined. The re-examination brought evolutionary philosophy to full maturity.

The most fundamental notion that had to be looked at again was time. Evolutionism forced philosophers to "take time seriously," in Samuel Alexander's well-known phrase. This is the sum of Darwin's influence on philosophy at the deepest level. All other problems and attitudes may be considered derivative from it. We shall presently remind ourselves of some of these more special developments in greater

detail, but just now it is appropriate to characterize the new feeling for time more exactly.

Traditionally, time had been, philosophically speaking, "always a bridesmaid, never a bride." It was a second-best, as defective as it was puzzling. Parmenides' "way of error," Plato's "moving image of eternity," the Christian scene of the drama of fall and redemption, but primarily the arena of sin and corruption—all treat time as finite, incomplete, futile, and frustrating. Time stood between man and his nature and had to be overcome. Following Hegel's lead, F. H. Bradley, Bernard Bosanquet, Josiah Royce, and numerous other idealist philosophers of the half-century after 1875, considered time unreal. Bradley called it "an appearance which contradicts itself."[4] The Absolute alone is real, and it is eternal. Time is but one of the innumerable, partial, fragmentary, defective appearances of the Absolute to finite beings incapable of fully comprehending the eternally Real. Time—and this is of the essence of pre-Darwinian tradition—defines a zone of twilight existence, neither quite real nor quite unreal, where everything incessantly passes away; true Being, Reality, never passes away but forever is.

The notion of evolution, first implicitly, then expressly, reversed the emphasis. Whatever passes away must first *come-to-be*. "Time" in the twentieth century became the name for coming-to-be rather than for "perpetual perishing." Note how radical the change wrought by stressing the first rather than the second member of the inseparable pair, coming-to-be and passing-away. The emphasis shifts from death to birth, from corruption to production, from nullification to creation. Time becomes henceforth the condition of significant achievement, the inexhaustible fountain of new wonders.

The great philosophers of evolution are one and all pre-

occupied in one way or another, with the creativity of time. Time brings forth what never was before and cannot be again. Less obstetrically expressed, time is precisely the process of coming-to-be, the incessant generation of novelty: there is nothing old under the sun. Time, creativity, novelty —these form the chord on which the mature philosophers of evolution composed their masterpieces. Darwin might perhaps have been surprised or even offended by some of their contentions, but he could hardly disclaim responsibility for a unique contribution to the climate in which their opinions flourished.

The three great contemporaries among the philosophers of evolution took hold of the new ideas each in his own way. Each brought them into relation with his primary philosophical interests. Each gave a characteristic expression to them. Among them, they exploited with genius most of the opportunities offered by the new ideas.

Creativity enters John Dewey's account in the form of "intelligence." It enters Bergson's metaphysics as the *élan vital.* Disguised as "emergence," it is of the essence of all evolutionary process, and thus it enters Alexander's cosmology as the basic fact. All three try to account for the possibility of novelty and its production in various modes, or at various levels of existence.

In his 1909 essay Dewey singled out the notion that species may originate in time as decisive for proper appreciation of Darwin's influence on philosophy. If species are not fixed, but come and go in time (it seemed plain to Dewey) most of the great philosophical tradition had to be rejected, or profoundly altered. This was, to his mind, a tradition in which the formal took precedence over the material, the rational over the empirical, the fixed over the fluent, essence over

existence. To such a tradition the stark rigidities of formal logic were appropriate. But if species are not fixed, eternal forms or essences determining existence, then they are contingent forms determined by matters of fact, and logic must become radically empirical. Experience alone, not abstract ideas, provides knowledge, and experience grows with the interaction, the give and take, of the organism and its context of actual existence. Neither nature nor experience nor knowledge is static, unchangeable; none of them is final at any moment. The old logic of rational computation with abstractions must be set aside as vain and profitless. In its place must arise an "experimental logic," the logic of the evolution of experience and of ideas.

True to his Hegelian upbringing, Dewey never ceased to regard logic as integral to cosmic development—with, of course, a characteristic difference. Logic, or method, is simply the way in which experience naturally grows. Experience is not only *of* but *in* nature; the experiencer is no aloof spectator coolly observing all time and all existence, but a participant learning by interaction with nature; the knower is not a mind, but an organism with mental functions. Thus Dewey's logic takes more from Darwin than the abstract denial of fixed essences: it takes the whole view of man as a natural organism surviving by his wits.

An organism so considered is an integrated complex of functions in dynamic interrelation with environing events in nature. It must maintain itself ("itself" is its pattern of activities) with the help of nature; but also in the face of natural obstacles and threats of many kinds, since nature is impartial. The organism, in a word, can never cease its struggle to survive. If there are circumstances to which it cannot adapt itself or which it cannot modify to suit itself, the organism

must disintegrate, die. For Dewey, being an organism is like riding a bicycle. If you stop moving, you fall off.

Also, if you try to ride pell-mell over every stone and pothole, you will be bumped off. The smart thing to do is to look ahead and take precautions, circumventing trouble or smoothing away obstacles. Such is the work of intelligence. Men are successful biologically because they have wits to live by. The fullest development, the product of a long experimental history, of this wit in practice is the method of deliberate experimentation in the face of difficulties, which characterizes modern science and technology.

Experiment methodically pursued, the central innovation and glory of modern science, has been called a "routine of discovery."[5] This routine had itself to be learned, or discovered, in the turmoil of trial and error. It is "natural" not as instinctive, but as successful in meeting natural conditions. It works; it turns nature against itself in our favor. But the key to its success, as Dewey never tired of emphasizing, is its inventiveness. The routine and repetitive, always doing the same thing in the same way regardless of circumstances, represented to him the epitome of stupidity. Habit is the paradigm of unintelligence. Intelligence, on the other hand, is always creative, alert to differences and original in response. Bare originality for its own sake never appealed to Dewey. What mattered was something effective in practice. Organisms exhibit intelligence by correcting their own mistakes. In this way intelligence is a natural product of evolution, since it promotes adaptation to environment by alertly avoiding old blunders while working out more successful ways of dealing with the moment-to-moment contingencies of life.

The foregoing rapid summary makes plain Dewey's orthodox Darwinism. Mind, from the evolutionary point of view,

is not a substance independent, in the Cartesian manner, of the material substance of the physical world; it is instead a group of functions of a brainy organism, which promote survival and thus establish the ascendency of intelligent species, by natural selection. Like fur or fang, swiftness or ferocity, or the opposable thumb, mind (or brain in action) is an organ of survival.

Dewey did not re-think the notion of evolution. He took it over, virtually intact, from biological science and fitted it into a set of philosophical ideas from other sources. Prominent among these are logical ideas concerning experimental method, and moral, social ideas clothed in pragmatic trappings but rooted in his New England conscience. He despised above all things the hypocrisy of a merely theoretical morality that divided and frustrated men. He insisted on checking the moral claims of any conduct against actual results. No ideal, no motive can be so exalted that its fruits become irrelevant to its nature. Conduct, if it is good, will sweeten individual and social life, not by definition or by convention or by institutional (e.g., ecclesiastical) authority, but by its natural consequences in actual experience. The moral man, in Dewey's view, must always act intelligently—that is, creatively and with constant attention to actual results so as to correct mistakes in plans and policies. In this manner, Dewey combined evolutionism, pragmatism, and experimentalism in a coherent system of thought.

But, like Darwin before him, Dewey expanded the scope of evolution from biological life to the whole spiritual life of man. Darwin had done this almost absent-mindedly and not with philosophical thoroughness. Not so Dewey, who was at heart always a moral philosopher. He expanded the scope of "nature" until he all but burst the utmost restraints of speci-

fic meaning, although he never wavered in his intention to promote naturalism. But in pressing the concept of nature to the utmost, Dewey also exposed aspects of it that mechanism had never needed to stress. Nature's actuality is renewed from moment to moment, ever fertile, ever pregnant with novelties, ever promising unprecedented riches of experience to those who do not waver in intelligent search for the natural means to these new attainments of life. In his own way, Dewey belonged to the great tradition of philosophy: for him, while thought and being are not one and the same, experience and nature are. Imbedded in this is the new idea of time as fertility. Human experience is a natural part of the great adventure of nature. But "nature" is far from the physical world of Descartes, or even of Newton and Maxwell and Planck and Einstein. Dewey himself did not subject the quasi-mechanistic concept of evolution to the radical criticism which his mature outlook seems to require.

Radical criticism was the work of Bergson, of Alexander, and, later, of Whitehead. The most brilliant and most original critic of the Darwinian concept of evolution, Henri Bergson had published his most valuable works before Dewey wrote the essay on the influence of Darwin and years before he had completed the statement of his philosophy. Scintillating style reinforced the fascination of fresh ideas. But such brilliance may also have to pay a price. Excitement over some of Bergson's more daring suggestions now seems to have diverted attention for a while from the acuteness of his fundamental criticism. It was easier to question certain of his exaggerations than to take sober measure of his basic position.

With the economy of genius, Bergson summed up his original contribution in the title of his greatest work, *Creative Evolution.*[6] If evolution was to have distinctive meaning,

Bergson saw it must express a feature of the universe that mechanism can not comprehend. He called this its creativity. Evolution implies that something really new comes into being; otherwise, we have nothing more than unexciting rearrangements of things in space. But if evolution is creative in essence, our scientific way of looking at nature must undergo drastic revision. We must modify our understanding of things and events both on the cosmic scale and on the scale of individual event.

Creativity in its cosmic dimension Bergson sometimes called the *élan vital*, "the surge of life." All life, for Bergson, expresses this ultimate creative principle. He does not consider life as the sum of living things; it is rather the surge of aspiration that differentiates itself in the myriad specific forms of particular life. Bergson sometimes writes of the surge of life as if it forms the source of all that is, both of life, which is at home in the intimacies of spiritual unity, and of matter, which is at home in the external relations of space. When the surge of life tires, relaxes its effort, then it degenerates, he suggests, into the inanimation of matter. Extension results from de-tension, loss of tension, the cessation of effort.

But Bergson also writes most commonly (for obvious reasons) of the surge of life as striving to make its way in a material world indifferent to the demands of life. Then it is that he may liken the surge of life to a torrent that splits itself as necessary to pass around obstacles or to seek out channels wherever they lie, until it fills every crack and crevice with its energies. The surge of life overcomes obstacles by a series of inventions, creative innovations, or discoveries, which differentiate it into the innumerable species that evolution has produced.

Bergson tries to show that the evolutionary record which

the biologists of his generation accepted supported the creative conception of evolution rather than the Darwinian mechanistic evolution. For example, the constructing of virtually identical eyes from different embryonic materials by species belonging to wholly independent branches of evolution stretches the explanatory power of chance variations to the limits of improbability. Equally implausible in Darwinian terms are various cases, cited by Bergson, in which a favorable variation requires the previous occurrence and retention of another variation, which, however, itself performs no ascertainable function save to prepare for the arrival of the advantageous variation yet to come. We do not ourselves have to judge the truth of these examples in order to appreciate how conscientiously Bergson reckoned with the best available scientific knowledge. He sought to write for scientist as well as for philosopher, for he believed, on carefully examined grounds, that the mechanistic version of evolution simply failed in application.

Creative evolution is the antithesis of mechanism. Every form of mechanism assumes determinism. Every event has a necessary and sufficient cause—*ad infinitum.* This means, as Bergson correctly insisted, that "all is given"—everything is settled forever. But evolution requires novelty, else nothing has happened. The key to innovation is invention, creativity. The course of evolution cannot be pre-determined either by material or by final causes. The surge of life expresses its own inner need, but it does not move inexorably toward foreordained goals. It must endlessly discover the range of its possible satisfactions by inventing or devising new expressions of vitality.

On the cosmic scale, time assumes a new value. It is real where new achievements are being created. It is nullified by

mechanism, which treats time as just another dimension of space. Mathematical models of events treat motion as a series of instantaneous positions, which might just as well coexist like a stack of snapshots. For Bergson this falsifies verifiable fact. It is useful for certain purposes, but as theory it runs counter to the simplest experience of motion, which is indivisible. I can move my hand from point *A* to point *B* in a single motion. If I should, instead, stop at some intervening point *C*, then it would take a new act, another motion, to go from *C* to *B*. A line *AB* can be divided into two segments *AC* and *BC*. The lines are static spatial figures. The motion *AC* is indivisable; it is temporal.

On the small scale, as well as on the cosmic scale, Bergson maintains the alliance of time and vitality, effort, creativity. At the most profound level of his criticism he recognizes that the problem of novelty forming the philosophical crux of evolutionism arises anew with the occurrence of each particular event—for example, each single motion. He takes the high line, not compromising with traditional habits of thought: there is motion but no *mobile,* no abiding substance that moves. The last drastic consequence of the notion of evolution is the denial of substance as something absolved of participation in the universal flux. The basic reality is event, process, motion. But motion here means the movement of life, the surge of life, self-renewing, profoundly imbued with ancient memories, striving now for nameless enrichment of the future.

With the sensitivity of a poet and the merciless criticism of a logician, Bergson stated, though he hardly solved, the problems evolution poses for philosophy: time, process, novelty, satisfaction.

Samuel Alexander's *Space, Time and Deity*[7] carried the

philosophical elaboration of the idea of evolution to its logical conclusion in one direction, at least. Alexander shows no trace of interest in Bergson's impressionistic, almost romantic intuition of the surge of life. He could not, like Dewey, be content with evolution as simply one great scientific discovery having powerful implications concerning humanity. For Alexander, if evolution figured significantly in the world, it must be systematically involved in all that happens, and the way it is involved must be describable. In particular, the evolutionary principle should be observable at levels where nobody would ordinarily recognize the occurrence of life; it should, in a word, manifest itself physically as well as biologically, psychologically, and sociologically.

Like other evolutionists, Alexander—to echo his phrase—took time seriously, and the special way in which he did so defines the originality of his contribution. The essence of evolution he saw in the occurrence of novelty. Unlike Bergson before him and Whitehead after him, he did not deal intensively with the inescapable novelty of every actual occurrence. Evolutionary novelty for Alexander meant primarily a generalized "origin of species," the appearance of some absolutely new *kind* of actuality on the cosmic scene. To designate this concept of absolute innovation he borrowed the term "emergent evolution" from the British biologist Lloyd Morgan, to whose book by that title Alexander appropriately acknowledged owing much more than a convenient expression. The antithesis of emergent evolution is what we may call reductionist evolution, if it is entitled to share the name "evolution" at all. It assumes that the higher evolutionary stage could be, with sufficient knowledge, computed or otherwise derived from antecedent conditions involving only entities at a lower stage. According to the idea of emergent

evolution, there comes a moment when a wholly new property emerges from a given complication of prior existents. The most familiar example of emergence is the appearance of life when certain physico-chemical conditions are satisfied; but Alexander finds many emergents in the evolution of the present state of the cosmos.

Another feature of "emergence" must be emphasized. The emergent, though irreducible to lower modes, yet depends upon the lower for its existence; on the other hand, the emergent determines its lower constituents to modes of behavior that they could not by themselves adopt. There is no life, for example, where there are no physico-chemical processes of organic physiology. But the animate body behaves in ways impossible to inanimate bodies. There is no conscious mentality apart from life; but mentality enables living bodies to behave in wholly new ways.

If we adopt Alexander's hypothesis that our cosmos has evolved by a series of emergent originations to its present intricacy and its subtlety of response, we must also follow his lead in back-tracking down the path of evolution to the most primitive conceivable origins. Space-Time is his name for the primordial basis of all existence. Time is as primitive as space; in fact, it could not be otherwise since each requires the other. Bare space and bare time, extreme abstractions from the real tissue of events, cannot actually exist. Descartes had identified physical nature with that which is spatial and left time a mystery referred to the continual creation of God; Bergson had treated the physicist's space as a fiction, a falsification of fact if not quite a fraud, whereas time expressed the creative surging of life; Alexander rescued elements of truth in both views by making use of ideas derived from relativity physics. He made the first thoroughly reasoned attempt to

bring specifically physical events into intelligible relation with evolutionary process.

That is Alexander's importance to the present study. We need not consider how he attempts to show that the three dimensions of space require and are required by the three aspects of time (continuous duration in succession, irreversibility, betweenness); or how he traces the successive emergence of the sensible qualities, materiality, vitality, mentality, value, and the prospective emergence of a next higher but unknowable quality of "deity"; or how he constructs a realistic theory of categories as part of a thoroughly realistic epistemology. He presents us with the traditional hierarchy of space (-time), matter, life, mind, and God, but now translated from static into temporal terms, from structural into evolutionary metaphors. The relation of the emergent to that on which it supervenes is in many respects identical with the relation of form to proximate matter in Aristotle. It is hard for us today to read Aristotle's description of the various stages of life ("soul")—vegetable, sensient, rational—in his so-called *Psychology* without reading evolutionary ideas into it. It might be no less difficult for Aristotle to read Alexander without reading his doctrine of formal hierarchies into the evolutionary picture. But beneath the undeniable similarity of these views, they project hierarchies of drastically contrasting types. The Aristotelian has a fixed goal, luring matter to meet its requirements. For Alexander, the emergent is (on the surface, at least) an unaccountable, a strictly empirical by-product of a chance complication of simpler processes.

Space-time and Deity denote opposite ends of the evolutionary scale. But what entitles Alexander to the assumption that "later" means "higher," that the more complexly conditioned emergent is better than the less? What entitles Alex-

ander to the assumption that evolution has an inevitably progressive tendency? How does he know that our aspiring after righteousness is not illusion? Perhaps there will be no next emergent—emergence is purely a matter of empirical fact, by definition incapable of rational anticipation. Perhaps the "deity" next emerging will turn out to be devilish.

In considering the course of evolution as the record of an upward trend in the cosmos, Alexander tacitly attributes an ambiguous role to "deity." The next higher stage can lure the effort of the lower only if somehow it enters already into the being of the lower stage. This suggests a bias in the universe, an implicit movement by "love," by need, desire, yearning, aspiration—in short, a God above and beyond the contingencies of the evolutionary process to underwrite a coming next emergent. Time must be taken seriously, yes; but it must also be seen in relation to significance beyond space-time. Evolutionary philosophy, we may summarize in conclusion, raised questions it did not answer. But they were fundamental questions which philosophers ought to take seriously.

III

Alfred North Whitehead read Bergson and learned from him, as he read and appreciated James and Dewey. He also refers to *Space, Time and Deity,* but he made little or no use of it. Actually, his mind owed more to the classical philosophers, particularly Plato and Locke, than to any of his philosophical contemporaries. The contemporary ideas that compelled his respect came from the technical precision and virtuosity of recent mathematics and symbolic logic and from the twentieth-century revolution in physics. But to speak of "influences" on Whitehead's thought diverts attention from

the point of real importance: whatever he learned from others was transmuted by the alchemy of genius.

We have now entered upon the third and last stage of the philosophical adventures of the idea of evolution in the century since 1859. This is the stage of the eclipse of the idea as a powerful speculative tool. Whitehead belongs somewhat ambiguously to this stage. He has much more in common with the major philosophers of evolution than with the positivists (of whom he was unsparingly and unanswerably critical) or the existentialists, to whom the most recent years owe a new philosophical note. He was interested in the same kinds of problems as Dewey, Bergson, and Alexander were interested in, but with superior refinement of vision and coherence of construction and was unresponsive to sweeping negations by which positivists secured their narrow field of vision, and to equally sweeping though radically different negations by which the existentialists secured theirs. On the other hand, Whitehead makes no more than incidental and passing reference to the idea of evolution in his great constructive works. The notion of evolution which we find in Darwin and Dewey, or in Alexander or, indeed, in Bergson, contributed little or nothing to the finished architecture of his thought. Whitehead took little interest in the origin of species; more basic than that and required for its evolutionary interpretation is adequate insight into the origin of individual entities. His genius focused with blinding brilliance on the basic innovation of mature evolutionism, an innovation upon which all the men we have discussed have relied without subjecting all its aspects to thorough analysis. Whitehead's debt to evolutionary philosophy went deep, for he owed to it his most basic question: how can we interpret process as reality? Bergson had spoken of motion without a *mobile,* but he offered only

a most impressionistic intuition of its nature. Dewey was often much closer to Whitehead because of his concentration on the passing adventures of actual situations; but, intent on other issues, he passed over the problems that absorbed Whitehead. With incomparable tenacity Whitehead wrestled with the problem of the coming-to-be of every individual event or "actual occasion," "actual entity," "occasion of experience."

All this carries us away from evolution as a constructive principle. That is how, in a most general sense, Whitehead contributed to the eclipse of evolutionary philosophy. His problem placed the central emphasis in a new place, and his systematic treatment of it reinforced this displacement. It is necessary to say a word about this in order to give substance to these very general interpretations; anybody acquainted with his works will know in advance that certain hints are all that a brief sketch can offer.

Whitehead's problem is not creative evolution but creative process, not emergent evolution of new qualities in the cosmos but emergence of new actuality each moment; not novelty of form or quality or species, but novelty of individual existence. Whitehead saw that creativity, though for him the ultimate cosmic principle, has its workshop, as it were, in individual actualities, or actual occasions. In the particular occasion, moreover, creativity is not absolute, but conditioned by relevant past actuality as a whole. The occasion owes the materials of its actuality to environing events that spread out to it in time, but it incorporates them into itself according to its own immanent self-constituting tendency, or "subjective aim," and thus realizes itself—achieves its little moment of creative actuality in a unique satisfaction. Thus it is that every entity comes to be.

Just as things that have happened, "the past," communicate themselves to the self-constituting present actuality, so each actual occasion in turn gives itself to the uses of future actuality. In this sense, though every finite actuality has its little moment of satisfaction and is no more, it never passes away into absolute nothingness as if it had never been. Every actuality enjoys what Whitehead calls "objective immortality." However insignificant an occasion may be, it makes just that insignificant but ineradicable actual difference to reality. An actual difference is one that nothing but an actuality can possibly make. It may be transformed by actual entities into which it subsequently enters or it may be ignored, resisted, rejected, but it cannot be made nothing.

Each individual occasion, event, or entity emerges uniquely from the past. It is a *new* actuality, an authentic emergent novelty. But Whitehead does not leave the notion of emergence, as Alexander did, on the level of unintelligible empirical fact that has to be accepted with "natural piety." For him, the process of coming-to-be involves the actual operation of both efficient and final causes. If achieved actuality did not transmit itself immediately to emerging actuality, then process would have nothing on which to work; on the other hand, if the entity in process of coming to be did not impose its own intrinsic tendency, or subjective aim, on the process by selecting some and rejecting other genuine alternatives available to it in a real future, then nothing would ever really happen, since then everything would already have been settled. Thus it is equally impossible to conceive of actual process without efficient causes and to conceive of it without final causes. Every actual entity is determined by the conditions of its origination, but it is also free in the realization of its own aim and the enjoyment of its own "satisfaction," or moment of indefeasible actual existence.

Whitehead's explicit adoption of final causes into his cosmology teaches one of the decisive lessons concerning the revolution in modern thought to which evolutionary ideas contributed. Evolutionism brought to philosophical attention the fertility of time, and it is in this way that it influenced philosophy most profoundly. It led to a radical revision of the mechanistic metaphor that defined the original bias of modern philosophy. Whitehead was fully aware of this change and stressed it by insisting on a philosophy of organism, rather than of mechanism. Bergson himself had demanded a changed outlook in his striking criticism of physical science, but he did not make plain the role of final causes in the creative unfolding of time. Whitehead did so, and thereby returned philosophy to classical models; his philosophy, the most independent and most up-to-date speculative effort of this century, belongs unmistakably to the Platonic tradition.

It remains only to suggest Whitehead's manner of meeting questions that Bergson, Alexander, and Dewey left in obscurity. In one way or another each had posed but not answered the problem of cosmic teleology. Bergson's surge of life is a frankly teleological creative principle. But in his anxiety to reject a universe in which everything was forever predetermined, whether by mechanical or by final causes, he left the teleology of the *élan vital* ambiguous and confused. The surge of life does not know in advance what it aims at —so be it! But if even matter is a by-product of life, then the surge of life must be wholly indifferent to what happens—one thing being as welcome as another—or else it must seek modes of actuality harmonious with its own intrinsic nature as life. Life seeks life, not non-life. But Bergson never clarifies this adequately. Alexander too, we saw, had a tacit teleology of emergence to which the radically empirical notion of *de facto* emergence scarcely entitles him. Dewey, for his

part, always assumes that "nature" includes as real possibilities all the moments of genuine goodness that intelligent conduct can bring about. This means that nature provides for man's purposes. But in terms of his naturalism, this must remain for Dewey an article of unsupported faith.

Whitehead realized that a world of process, of true self-realizing activity, required a philosophical ground in an adequate theology. The details of Whitehead's theology, certainly in itself a topic worthy of painstaking examination, do not matter to the present study. It is enough to point out his conclusion that process can be understood as real only if it is conceived to be involved in an eternal ground. This is the aspect of God which he calls His "primordial nature," the immanent tendency of process, the bias in things that favors certain possible futures over others, the inalterable establishment of the abstract order of value or importance in the universe. It is by reference to this scale that developments may be "higher" or "lower" as well as simply later.

Whitehead does not intend this conception to imply the kind of inflexible determination of the world by final cause to which Bergson objected. His whole emphasis celebrates the freedom of each individual occasion to shape its own being—however crudely. The outcome of world-process is not foreordained; there is still genuine contingency in process—the future will be as it is made. Thus if God is not simply an abstraction or a remote and indifferent spectator (after the fashion of Plato's worst kind of atheism), He must have a constant concern for the adventures of free process. Thus God has His "consequent nature," in Whitehead's language. He needs the world, as the world needs Him. He allows it free activity and the time of real novelties, but redeems all the inevitable inadequacies of limited entities. Real time, in

short, requires for its rational comprehension a thoroughly examined theology; but it is a theology as new as the conception of real time, if Whitehead understood it aright.

Whitehead does not hold forth expectations of inevitable progress to higher levels of realization. Evolution, in this sense, he leaves behind. He directs attention to questions at once more novel and more traditional than those of the major evolutionist philosophers. He deals profoundly with the most basic question raised by evolutionism, and by doing so transcends the provincialism inherent in an idea derived from a single scientific realm.

In 1929, when his Gifford Lectures, *The Quest for Certainty,* appeared, Dewey was already seventy years of age. Whitehead's major works were describing nature in a new way. Alexander's work was done. Bergson had published little for many years; and though a few years later he would again present a masterpiece to the world, *The Two Sources of Morality and Religion,* it would be his swan song—and that of evolutionism, too—as a creative factor in philosophical thought. Already Bertrand Russell's "scientific method in philosophy," his "logical analysis," had spread via Ludwig Wittgenstein's *Tractatus Logico-Philosophicus* (1920) to the European continent. There, in the late 'twenties and early 'thirties, this methodical tendency was converted into an uncompromising philosophy by Rudolph Carnap, Otto Neurath, Moritz Schlick, Hans Reichenbach, and other members of the "Vienna Circle." This view married traditional positivistic attitudes to the analytical techniques of symbolic logic and utterly rejected all "metaphysics," including, of course, evolutionism. This movement was joined by the indigenously English movement of philosophical or linguistic analysis, which owes much to G. E. Moore's "common-sense" approach,

as well as to Wittgenstein's later teaching. Though they differ in important respects, we may for the sake of brevity treat them as allies in promoting analytic philosophy.

In exactly the same short span of years, another movement of thought on the Continent had suddenly gathered impressive momentum because of Martin Heidegger's work of genius, *Sein und Zeit* (1927). The title, ordinarily translated *Being and Time*, may be more pointedly rendered *Reality and Process*, to emphasize the coincidence of its publication at almost the same time as Whitehead's *Process and Reality* (1929); but two less similar works would be hard to imagine. *Sein und Zeit* served notice that the German vogue of Kierkegaard and Nietzsche in the miserable years following the shattering experience of the First World War had had profoundly important consequences. It was soon recognized that somewhat similar things were already being said by Karl Jaspers, who had come to philosophy through the practice of psychiatry, the effort to understand his patients having brought him to reflect on the inmost attitudes of every mind, beyond reach of reason and persuasion.

This "existentialist" movement took human life on its inside at the level of its deepest commitments. In so doing, it turned squarely against the whole pursuit of "objectivity" characteristic of the modern intellectual epoch. An evolutionary metaphysics becomes not merely false or even "meaningless" (as positivists might have said) but irrelevant. It has simply nothing to do with the continuing crisis which is the burden of life for each individual one of us.

In the English-speaking world, so many philosophers have worked at analysis of one kind or another that a recent popular paperback, purporting to offer a characteristic sample of twentieth-century philosophical writing, is called *The Age*

of Analysis. A European, or even a Latin American, if he prepared a similar volume, might well name it *The Age of Existentialism.* It might include excerpts from Marcel and Sartre, from Heidegger, Jaspers, and Paul Tillich, from Martin Buber, from Nicolas Berdyaev, and from others. Only for the English-speaking among Western peoples has this way of approaching the reflective tasks of life had little appeal; though even here we must make an exception of theologians, many of whom have borrowed existentialist formulæ to express their religious intuitions.

These two movements, then, existential and analytical, have eclipsed older ways of doing metaphysics, one attacking from the subjective and the other from the objective side. Both have too much scope and variety even for the most cursory treatment in this paper; but it would be improper to close without indicating with more precision, though very briefly, the attitudes they take toward problems interesting to evolutionary philosophers.

In a variety of ways analytical philosophers have centered their interest on making clear what our languages, customary and contrived, mean. This activity tends to assume for them the whole identity of philosophical practice. Empirical questions belong to science, which offers the only tested methods of verification. Other seemingly empirical questions, including many traditionally discussed by learned philosophers, turn out, they say, to concern matters of linguistic usage or of logical syntax. In any case, questions of process, of novelty, of emergence, of creativity, of cosmic teleology are either handed over to natural science or are reduced to problems of usage, customary or technical. Philosophy in the grand manner—Bergson's, Alexander's, Dewey's, Whitehead's —is simply not attempted. Cosmology, evolutionary or not,

may afford some subjective comfort to men's feelings but cannot make good any claim to rigorous critical objectivity.

Existentialism for its part does not simply look the other way in passing by traditional metaphysics. It transforms the central metaphysical question. Speaking largely with Heidegger in view, we may say that the time of his basic philosophical reflection is not the time of physics or of evolution, or even, quite, of Whitehead's process. It is the subjective time of the agony of decision, of dread of ultimate responsibility, of concern for finding something worthwhile to a temporal being lost in a wasteland of meaninglessness. Time for the existentialist connotes finitude, the crushing burden of temporality. His distress reaches its highest pitch in his awareness that as a being bound to time he is constantly giving himself actuality by inward affirmation of this or that alternative. He precariously holds on to his little moment of being by projecting himself into, or dangling himself over, the abyss of sheer nothingness, while the aid he needs and seeks withholds itself or turns away. This turning away, says Heidegger, is an occurrence in time—that is, a definite empirical event in human inward existence. Being is a creativity that yields the only possible answer to the question of questions: why is there something rather than nothing? We are ourselves beings, the plural pointing to our finitude. We in a way know, or at least surmise, Being or Reality, because we are ourselves beings and are real. But the point of the story escapes us. We know that we are *temporary,* as well as temporal beings: we shall die. Each day lights our path to dusty death. We did not choose to live; yet here we are, cast up on the shores of life, to make our way without signposts to—death. Why is there something rather than nothing? The point escapes us. Heidegger never, I think, ventures

beyond this doubt; his self-appointed task is to bring home to others the true desperateness of the human situation. But his later writings hint perhaps at an answer like Job's. Certainly other existentialists hasten—much more eagerly—to the reassurance of a traditional theological conclusion.

Sketchy as this portrayal undeniably is, it will surely underscore enough the existentialist's total diversion of attention from objective questions of fact and cosmos. What am *I* doing here? is their problem, and they have no genuine interest whatever in what *here* is, and how it came to be as it is. The metaphysics of evolution is in full eclipse.

But must it so remain? When analysis and existentialism have mellowed and abandoned their exaggerations, will new appreciation of evolution be born?

That is a question for the next century, not for the years 1859-1959.

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NOTES

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2. John Dewey, "Darwin's Influence on Philosophy," *Popular Scientific Monthly*, July, 1909, pp. 90-98; reprinted as "The Influence of Darwinism on Philosophy" in *The Influence of Darwin on Philosophy* (New York, 1910), pp. 1-19.
3. Andrew Dickson White, *A History of the Warfare of Science with Theology*, 2 vols. (New York, 1896). Evolution is discussed in Vol. I, ch. 1.
4. Francis Herbert Bradley, *Appearance and Reality*, 9th Impression (Oxford, 1955), p. 185.
5. Edward G. Ballard, "The Routine of Discovery," *Philosophy of Science*, XX, 2 (April, 1953).
6. Henri Bergson, *Évolution Créatrice* (Paris, 1907), trans. Arthur Miller (London, 1911).
7. Samuel Alexander, *Space, Time and Deity*, 2 vols. (London, 1920), being Gifford Lectures of 1916-1918.